Scientific Inquiry

7-1 The student will demonstrate an understanding of technological design and scientific inquiry, including the process skills, mathematical thinking, controlled investigative design and analysis, and problem solving.

7-1.6 Critique a conclusion drawn from a scientific investigation.
Taxonomy Level: 5.2-B Evaluate Procedural Knowledge

Previous/Future knowledge: In 2nd grade (2-1.4), students inferred explanations regarding scientific observations and experiences. In 3rd grade (3-1.6), students inferred meaning from data communicated in graphs, tables, and diagrams. In 5th grade, students evaluated results of an investigation to formulate a valid conclusion based on evidence and communicated the findings of the evaluation in oral or written form (5-1.6) and also planned and conducted controlled scientific investigations, manipulating one variable at a time (5-1.3). In 6th grade (6-1.4), students used a technological design process to plan and produce a solution to a problem or a product (including identifying a problem, designing a solution or a product, implementing the design, and evaluating the solution or the product). In 8th grade (8-1.3), students will construct explanations and conclusions from interpretations of data obtained during a controlled scientific investigation.

It is essential for students to know that once the results of an investigation are collected and recorded in appropriate graphs, tables or charts, the data should be analyzed to figure out what the data means. The results of the investigation are then compared to the hypothesis. A *valid conclusion* can then be written and should include:

- The relationship between the independent (manipulated) variable and dependent (responding) variables based on the recorded data, and
- Whether the hypothesis was supported or not supported.

Inferences are sometimes needed to help form a valid conclusion.

- An *inference* is an explanation of the data that is based on facts, but not necessarily direct observation.

The conclusion is then communicated to allow others to evaluate and understand the investigation.

Assessment Guidelines:
The objective of this indicator is to *critique* a conclusion drawn from a scientific investigation; therefore, the primary focus of assessment should be to determine whether a conclusion is appropriate for a given scientific investigation. However, appropriate assessments should also require students to *summarize* the steps in a controlled scientific investigation; *compare* a conclusion to the appropriate investigation; *compare* a conclusion to a given hypothesis; or *select* an appropriate conclusion for a given investigation.